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10/773,147	02/09/2004	Jyunko Iwasaki	Q79749	5423

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EXAMINER	
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ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/773,147	IWASAKI ET AL.	
	Examiner	Art Unit	
	Kenneth J. Malkowski	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 and 8-11 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2002/0044324 to Hoshida et al.

With respect to claim 1 Hoshida discloses an optical transmission system (title: optical communication system)(Figure 1 with transmitter 11 and receiver 13) with optical amplifier repeater (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station)), comprising: a plurality of repeaters (Figure 1, 14-1 – 14-m+1) each of which has an optical amplifier and a plurality of pumping light sources (Figure 19)(page 2 paragraph 24 (each repeater station supplies a plurality of pump lights corresponding to a plurality of wavelength bands in the optical transmission line)) and outputs a pumping light with a different pumping wavelength spectrum to achieve a different gain spectrum (page 1 paragraph 13 (invention utilizes distributed amplification wherein amplification of different parts of the spectrum takes place over a fixed distance))(page 2 paragraph 24 (each amplification site is assigned a certain wavelength band to keep within a predetermined range of power))(page 4 paragraph 70-71 (wavelengths of each respective pump lights may be different from one another))(page 5 paragraph 83-84 (pump lights assigned to each repeater station all have

different wavelengths which are set at installation)) ; and an optical fiber transmission line for Raman amplification (page 5 paragraph 93 (Raman amplification in the optical transmission line 12))(Figure 1); wherein: the repeaters (14-1 – 14-3a predetermined gain control zone allocated to the optical fiber transmission line (Figure 1 shows one repeater among several repeater stations assigned to each zone of Raman amplification (12-1 – 12-3)).

With respect to claim 2, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 1 (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(figure 1), wherein: a plurality of gain control zones each having approximately the same length is allocated to the whole of the optical fiber transmission line (Figure 1 depicts repeater stations 14-1 – 14-m+1 evenly spaced throughout the entirety of optical transmission line 12).

With respect to claim 3, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 1 (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), wherein: at least one gain control zone is allocated to the optical fiber transmission line (page 4 paragraph 68 (optical transmission line 12 is repeated in multiple stages by repeater stations 14. the pump light from light source 21-n in repeater station 14-m is supplied to optical transmission stage 12-m))(Figure 1: repeater station 14-1 provides Raman amplification for the zone of fiber marked 12-1. this pattern repeats for each following section).

With respect to claim 4, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 1 (page 1 paragraph 9 (concentrated optical amplifying

apparatus is provided in the repeater station))(Figure 1), wherein: the pumping wavelength spectrum from each repeater is determined so that a total gain spectrum obtained by Raman amplification (page 4 paragraph 79 (Raman gain is wavelength dependent, the powers of respective optical signals after amplification are different from each other)) using a total pumping wavelength spectrum made of the different pumping wavelength spectra (page 4 paragraph 70 (respective pump lights at repeater stations are different from each other)) within one gain control zone becomes flatter than a gain spectrum obtained by Raman amplification using a single pumping wavelength spectrum from each repeater (pages 4-5 paragraph 80 (pumping light exists at a plurality of wavelengths, local minimums and local maximums are offset by each pump light at each repeater station whereby the gain as the function of wavelength becomes almost flat)(Figures 2-3 shows the pump light gain for one control zone wherein a certain amplification band achieves a flatter gain spectrum)).

With respect to claim 5, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 1 (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), including: an optical source failure monitoring section for detecting an occurrence of a failure in at least one of the pumping light sources (page 2 paragraph 28 (power of the pump light is controlled while a disconnection of the transmission lines is monitored))(page 3 paragraph 30 (it is possible to monitor the occurrence of optical damage at a supplying destination and prevent occurrence of optical damage during normal operation of the optical transmission line)); and a gain spectrum compensating section for, when the optical source failure monitoring section detects a failure, compensating a distortion in a gain spectrum caused by the failure (page 2 paragraph 27 (optical powers of the

pump light, the optical signal, and reflected pump light are detected and according to the detection result, compensation is administered via optical power adjustment of the pump light)).

With respect to claim 8, Hoshida discloses an optical transmission system with optical amplifier repeaters (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), comprising: an optical fiber transmission line (page 4 paragraph 68 (optical transmission line 12)); a plurality of Raman amplification optical fibers (Figure 1 shows one repeater among several repeater stations assigned to each zone of Raman amplification (12-1 – 12-3)); a plurality of optical amplifier repeaters (Figure 1, 14-1 – 14-m+1); and a gain control device (page 2 paragraph 24 (optical powers of the plurality of pump lights are adjusted according to optical power detection results)); wherein: the respective optical amplifier repeaters include a plurality of pumping light sources (page 2 paragraph 24 (each repeater station supplies a plurality of pump lights corresponding to a plurality of wavelength bands in the optical transmission line)); the respective optical amplifier repeaters are located in the optical fiber transmission line at intervals (Figure 1 depicts repeater stations 14-1 – 14-m+1 evenly spaced throughout the entirety of optical transmission line 12), and supply pumping lights from the plural pumping light sources to the corresponding Raman amplification optical fibers (page 4 paragraph 68 (optical transmission line 12 is repeated in multiple stages by repeater stations 14. the pump light from light source 21-n in repeater station 14-m is supplied to optical transmission stage 12-m)); and the gain control device includes: a gain characteristic determining section for inputting therein signal lights transmitted via the optical amplifier repeaters to determine gain characteristics in a frequency range required for transmitting all of the signal lights (page 2 paragraph 23 (band detecting means are provided for detecting the optical power of the optical

signal amplified by the pump light in each of the plurality of wavelength bands)); and a power adjustment instructing section for, when the gain characteristic determining section determines that predetermined gain characteristics have not been obtained, instructing an optical amplifier repeater, which includes a pumping light source for outputting a pumping light required for achieving the gain characteristics, from among the plural optical amplifier repeaters to adjust the power of the optical amplifier repeater (page 2 paragraph 24 (a band adjusting means is provided for adjusting the optical powers of each of the plurality of pump lights according to a detection means so as to keep the optical power from each of the signal lights within a predetermined fixed range)).

With respect to claim 9, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 8 (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), wherein: the gain control device further includes a plurality of pumping light sources each of which outputs a pumping light having a different wavelength (page 1 paragraph 13 (invention utilizes distributed amplification wherein amplification of different parts of the spectrum takes place over a fixed distance))(page 2 paragraph 24 (each amplification site is assigned a certain wavelength band to keep within a predetermined range of power))(page 4 paragraph 70-71 (wavelengths of each respective pump lights may be different from one another))(page 5 paragraph 83-84 (pump lights assigned to each repeater station all have different wavelengths which are set at installation)), wherein: when the gain characteristic determining section determines that predetermined gain characteristics have not been obtained lights (page 2 paragraph 23 (band detecting means are provided for detecting the optical power of the optical signal amplified by the pump light in each of the plurality of

wavelength bands)), the power adjustment instructing section instructs a power source for outputting a pumping light required for achieving the gain characteristics from among the plural pumping light sources to adjust the power of the pumping light source (page 2 paragraph 24 (a band adjusting means is provided for adjusting the optical powers of each of the plurality of pump lights according to a detection means so as to keep the optical power from each of the signal lights within a predetermined fixed range)).

With respect to claim 10, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 8 (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), wherein: each of the optical amplifier repeaters includes an optical circulator for inputting in the optical amplifier main signals transmitted via the optical fiber transmission line (90, Figure 6)(152, Figures 12 and 15), and outputting the pumping lights from the plural pumping light sources to the optical fiber transmission line in the direction opposite to the direction where the main signals proceed (page 12 paragraph 209 (the WDM signal is made incident through connector 151 which optically connects between optical circuits and the WDM coupler 152))(page 7 paragraphs 113-114 (backward pumping against the main signal is utilized in at least one repeater station)).

With respect to claim 11, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 9 (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), wherein: each of the optical amplifier repeaters includes an optical circulator for inputting in the optical amplifier main signals transmitted via the optical fiber transmission line (90, Figure 6)(152, Figures 12 and 15), and outputting the pumping lights from the plural pumping light sources to the optical fiber

transmission line in the direction opposite to the direction where the main signals proceed (page 12 paragraph 209 (the WDM signal is made incident through connector 151 which optically connects between optical circuits and the WDM coupler 152))(page 7 paragraphs 113-114 (backward pumping against the main signal is utilized in at least one repeater station)).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0044324 to Hoshida et al. in view of U.S. Patent Application Publicaiton No. 2002/0054733 to Kagi et al.

With respect to claim 6, Hoshida discloses an optical transmission system with optical amplifier repeaters as claimed in claim 1 (page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), however, Hoshida fails to disclose that each of the repeaters includes a pair of polarized wave pumping sources. However, such a limitation is well known in the art as an advantageous element. Kagi, from the same field of endeavor discloses at least one pair of polarized wave pumping light sources which output pumping lights having the same wavelength (LD1-LD5 each comprise two light sources which are the same wavelength)(page 3 paragraph 48 (LD1- LD6 have two Fabry-Perot type lasers with the same central wavelength)); and a polarized wave synthesizing section for synthesizing

polarized waves of the pumping lights from the pair of the polarized wave pumping light sources (page 3 paragraph 48 (a polarization-beam coupler 32 couples the laser outputs into one output)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the pair of polarized lights and polarization combining as disclosed by Kagi into the Raman pumping as disclosed in the system as taught by Hoshida. The motivation for doing so would have been to increase the pumping power of each central wavelength being pumped as well as reduce polarization dependency of Raman gain (Kagi: page 3 paragraph 48).

With respect to claim 7, Hoshida in view of Kagi disclose an optical transmission system with optical amplifier repeaters as claimed in claim 6 (Hoshida: page 1 paragraph 9 (concentrated optical amplifying apparatus is provided in the repeater station))(Figure 1), including: a gain spectrum compensating section for (Kagi: 11, Figure 1 (gain profile estimation section)), when a failure occurs in an output of the pumping light from either of the polarized wave pumping light sources in the pair, compensating a distortion of a gain spectrum caused by the failure by controlling an output from the other polarized wave pumping source (Kagi: page 2 paragraph 28 (in the case of fluctuating transmission loss due to fluctuating signal light power, quality can be maintained by changing the wavelengths of a pumping light and pumping light output power according to their fluctuations)).

Response to Arguments

4. Applicant's arguments filed 3/30/07 have been fully considered but they are not persuasive. With respect to claim 1, applicant argues that the reference cited does not include a plurality of repeaters which has an optical amplifier and a plurality of pumping light sources. As this was a newly added limitation, it is obvious why this was not included in the initial rejection.

However, this limitation is taught by Hoshida. In Figure 19 Hoshida shows a plurality (two) repeaters both of which include optical amplification and a plurality of light pumping sources (pages 21-22 paragraphs 378-381).

With respect to claim 8, applicant states on pages 8-9 of remarks that claim 8 recites that the gain control device includes a power adjustment section for "instructing an optical amplifier repeater...from among the plural optical amplifier repeaters to adjust the power of the optical amplifier repeater." Applicant goes on to conclude that this means that "the gain control device is separate from the plurality of the optical amplifier repeaters." However, this is not actually stated in the claims. The claims merely state that the power adjustment instruction section must instruct an optical amplifier repeater *from among the plural optical amplifier repeaters* to adjust the power of said repeater. In this way even if the gain control device is not separate from the plurality of amplifier repeaters, because it controls one amplifier repeater *from among the plural optical amplifier repeaters* the claimed limitation has been met. Hoshida teaches such a power adjustment instruction on page 2 paragraph 24.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to optical rotational transmission systems in general:

U.S. Patent Application Publication No. 2003/0210913 to Kakui et al. is cited to show optical repeaters with Raman amplification and backwards pumping

U.S. Patent No. 7,075,710 is cited to show Raman amplification with multiple light sources

U.S. Patent No. 6,292,288 is cited to show a substantially similar invention to that of the claimed invention

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Malkowski whose telephone number is (571) 272-5505. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

6/7/07

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER